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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,368	07/18/2005	Gregory D. Len	10585.0054	4647

22852 7590 10/01/2010

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EXAMINER	
YANCHUK, STEPHEN J	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
10/01/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,368	LEN ET AL.	
	Examiner	Art Unit	
	STEPHEN YANCHUK	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/01/2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-14 and 16-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-14 and 16-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

METHOD AND SYSTEM FOR CONTROLLING FLUID FLOW IN A FUEL PROCESSING SYSTEM

Examiner: S. Yanchuk SN: 10/533368 Art: 1795 November 27, 2009

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/01/2010 has been entered.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 10-14,16-29 are rejected under 35 U.S.C. 102(a) as being anticipated by Okamoto (PGPUB 2002/0182465).

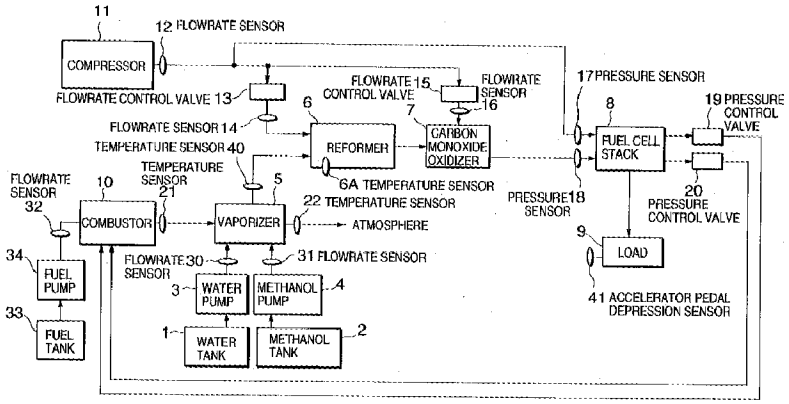


FIG. 1

Okamoto Figure 1

Okamoto teaches a fuel cell stack vaporizer with control method as shown in figure 1. The fuel reformer (6) comprises a sensor and control valve (14, 13); The cleanup unit comprises a sensor and controller (16, 15); The fluid conduit to the fuel cell has a pressure sensor (17) [Figure 1]. The air amount to the reformer is determined based on the detection temperature of the temperature sensor (6A) [Paragraph 35]. The third sensor and controller is controlled by the electric power generated and accelerator depression [Paragraph 37-39]. The control system as described by Okamoto is able to perform the same task as the claimed invention. The claim limitation to "sensor…not a fluid flow rate sensor" does not limit the structure to omit a fluid rate sensor, only that the controller must factor in another input from a non-flow rate sensor before making adjustments; the prior art teaches such sensors and control mechanisms [Figure 1, Paragraph 33-39].

The applicant defines "time constant" as the characteristic time for a response to be completed to a defined extent. The prior art operates in the same manner in terms

of the physical requirements of the system. The applicant has defined a system that uses lagging or slow response valves and fast response valves whereas the instant application takes constant readings to meet demands when they arise. Although they operate differently, the sensors are the same and the controllers operate in substantially the same manner since the system is given the necessary reactants when it is needed. The controller of the prior art is also capable of performing the same task of delaying the opening of valves since the prior art teaches a complex system that responds to independent stimulus.

Claim 11: Okamoto teaches element [14] to be a flow rate sensor.

Claim 12: Okamoto teaches air passes through the sensors into the various parts of the system [Figure 1, Paragraph 33-39].

Claim 13, 16: Okamoto teaches control of the compressor [Paragraph 32].

Claim 14: Okamoto teaches a control valve and connecting pipe to all elements as depicted in figure 1.

Claim 17: Okamoto teaches control valves for the second fluid stream (15).

Claim 18: Okamoto teaches a combustor element [10] that receives a controlled rate of air flow from a valve (19). This combustor has an inlet of air and is controlled along the line to limit and allow air and therefore reads on the claim.

Claim19-22: Okamoto teaches a fuel reform process involving the elements of Figure 1 (10, 5, 6, 7) wherein the applicant has claimed equivalents known in the art. The control structure submitted by the applicant and control structure would be the same for those systems and therefore the claims are rejected.

Claim 23: The water tank (1) has a pump (3) that has a flow rate sensor (30), temperature sensor (40), and pressure sensor (18) associated with it [Figure 1]. The system controller of the prior art operates in a manner that uses algorithms and computations instead of lagging valves but operates in the same manner, therefore the instant application is overcome.

Claim 24: The fuel tank (33) has a fuel pump (34) that is controlled by a flow rate sensor (32), temperature sensors (21, 40, 6A) and a pressure sensor (18).

Claim 25: The compressor would comprise a pump (11).

Claim 26: The air amount to the reformer is determined based on the detection temperature of the temperature sensor (6A) [Paragraph 35] and a flowrate sensor (14).

Claim 27: An air flowrate sensor is taught (16).

Claim 28: The third sensor comprises a sensor that monitors the electricity production rate or demand [Paragraph 38-39].

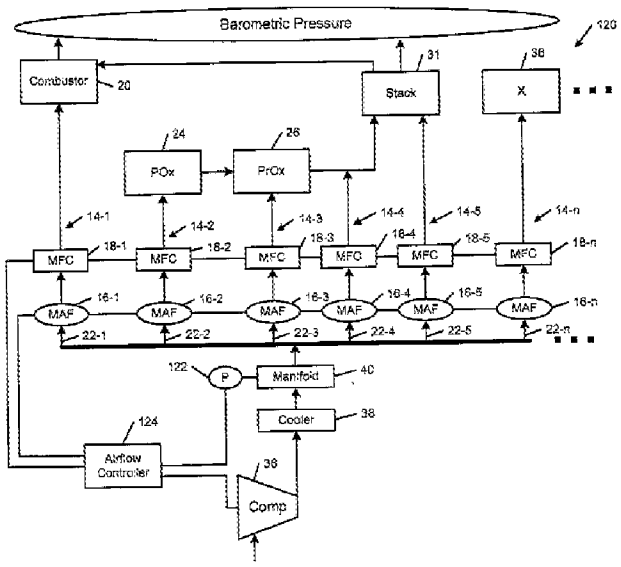
Claim 29: The system of the prior art is capable of producing a stream of 10% the average flow volume. The first air valve will get first take of the flow volume and therefore dictates how much is available for the remainder of the system. The system of the prior art is capable of operating in the same manner since the sensors give the specific amount of required fluid when it is demanded. The prior art inherently teaches the specific claimed limitation since it is capable of resulting in claim manner when the system requires it.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 10-14, 16-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelskula et al (PGPUB 2003/0186096) and further in view of Okamoto (PGPUB 2002/0182465).



Keskula Figure 3

Kelskula teaching an air distribution method and controller for a fuel cell system. One of his embodiments is shown in figure 1 which comprises:

Fuel reforming unit (24) having a fluid inlet (14-2);

Hydrogen-cleanup unit (26) having a fluid inlet (14-3);

Fluid conduit for providing fuel to the fuel cell (14-4, 14-5);

Controller (50).

The controller communicates with the various MAFs (Mass airflow sensors) to adjust the MFCs (Mass airflow controllers), which the MAF takes a reading based on a timer and the MFC makes adjustments based on the reading [Paragraph 9].

The claimed functionality of the controller is:

Open the flow valve for a specific fuel cell subsection;

1st Sensor associated with the first fluid inlet that regulates the rate of fluid (18-2, 16-2);

2nd Sensor associated with the second fluid inlet that regulates the rate of fluid (18-3, 16-3);

3rd Sensor associated with the third fluid inlet that regulates the rate of fluid (18-4, 16-4);

Sensor reading has some form of time constraint in which it measures pressure [Paragraph 24-27], the inlets for the other fuel cell subsections are regulate;

Controller is capable of flowing less than 10% the initial volume of fluid compared to the first inlet.

The controller described in the prior art is capable of performing the claimed functionality. The airflow sensor (16-2) senses the airflow in the tubing (22-2) and the mass airflow controller (18-2) adjusts and controls the airflow that is delivered to the POx reactor (24) [Paragraph 20]. The other fuel cell subsystems have the same capabilities [Paragraph 21]. The sensors take readings periodically (time) [Paragraph

9]. The method of control for the controller is described in Paragraph 25 & Paragraph 26.

In the state when the fuel cell subsystems are turned off, the pressure of the system will be lower than operational pressure. When the system is activated, the pressure of the systems will need to be increased starting with the first inlet. The volume flow of fluid into the first inlet will need to be significantly higher in order get the system operational. The remaining volume flows will be lower because of this. The examiner holds that the controller inherently is capable of performing the last limitation taught by the applicant.

Kelskula fails to teach a sensor being different than a time based pressure sensor acting as a flow sensor.

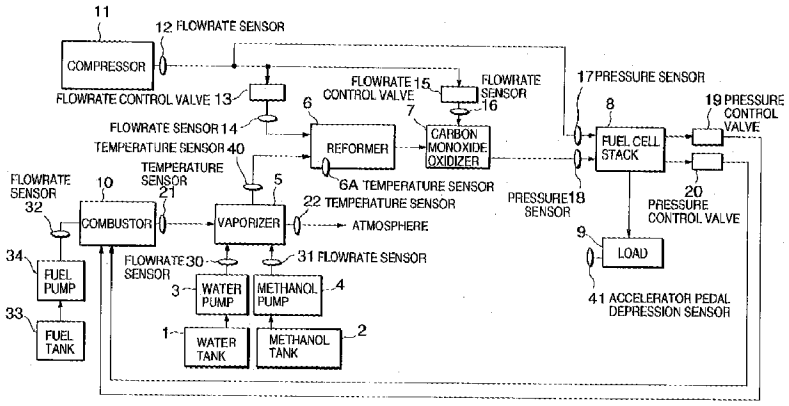


FIG. 1

Okamoto Figure 1

Okamoto teaches a fuel cell stack vaporizer with control method as shown in figure 1. The fuel reformer (6) comprises a sensor and control valve (14, 13); The cleanup unit comprises a sensor and controller (16, 15); The fluid conduit to the fuel cell

has a pressure sensor (17) [Figure 1]. The air amount to the reformer is determined base d on the detection temperature of the temperature sensor (6A) [Paragraph 35]. The third sensor and controller is controlled by the electric power generated and accelerator depression [Paragraph 37-39]. Okamoto provides an equivalency of a pressure sensor to manage the flow of reactant through the system. It would have been obvious for one of ordinary skill in the art to use the teachings of Okamoto to modify Kelskula because Okamoto teaches an efficient fuel processing system that prevents the temperature of the vaporizer of a fuel cell power plant from falling below a temperature [Paragraph 4-13].

Rejections stated above in view of Okamoto should be applied for the dependant claims. They are not transcribed in an effort to produce a more concise response.

Claim 11 is rejected by the teaching of a fluid flow rate sensor at the first inlet (16-2).

Claim 12 is rejected by the teaching of the fluid being air [Abstract].

Claim 13 is rejected by a compressor (37) that is connected to an inlet of the fuel cell subsystems (14).

Claim 14 is rejected by a connecting pipe (22) that attaches to all subsystems (plenum) and controllable valves that regulate the flow to the subsystems (18).

Claim 16 is rejected by the teaching of the compressor changing the pressure affects the dynamics of the fuel cell subsystems [Paragraph 28].

Claim 17 is rejected by the sensors and controllers (valves) control the rate of input of fluid into the respective subsystems [Paragraph 20-21].

Claim 18 is rejected by a combustor (20) with a fluid inlet (14-1) with a sensor (16-1) and fluid flow controller (18-1) wherein the sensor is in communication with the airflow controller (50) that is in communication with the other subsystems including the fuel reforming unit, the hydrogen-cleanup unit, the fuel cell, and the combustor. This combustor is equivalent to a "tail gas combustor" because of its link to the fuel cell (31) [Paragraph 19].

Claim 19 is rejected by a partial oxidant reformer (POx) (24).

Claim 20 is rejected by the teaching of an air controller for a fuel cell system that requires multiple air inputs. An autothermal reformer is an obvious substitution for the already existing fuel reformer unit and therefore is anticipated by the reference.

Claim 21 is rejected by the teaching of an air controller for a fuel cell system that requires multiple air inputs. A pure steam reformer is an obvious substitution for the already existing fuel reformer unit and therefore is anticipated by the reference.

Claim 22 is rejected by the teaching of an air controller for a fuel cell system that requires multiple air inputs. A water gas shift reactor is an obvious subsystem to the fuel reforming unit but does not require an air input and therefore is not disclosed in this prior art. Although the water gas shift reactor is not pictured here, one of ordinary skill in the art would understand the various subsystems for fuel reforming and would have incorporated it in the system as a whole.

Claim 23: Okamoto teaches the water tank (1) has a pump (3) that has a flow rate sensor (30), temperature sensor (40), and pressure sensor (18) associated with it [Figure 1]. The system controller of the prior art operates in a manner that uses algorithms and computations instead of lagging valves but operates in the same manner, therefore the instant application is overcome.

Claim 24: Okamoto teaches the fuel tank (33) has a fuel pump (34) that is controlled by a flow rate sensor (32), temperature sensors (21, 40, 6A) and a pressure sensor (18).

Claim 25 is rejected by the compressor (37) being coupled to the first inlet wherein a compressor is an air pump.

Claim 26: Okamoto teaches the air amount to the reformer is determined based on the detection temperature of the temperature sensor (6A) [Paragraph 35] and a flowrate sensor (14).

Claim 27: Okamoto teaches an air flowrate sensor is taught (16).

Claim 28: Okamoto teaches the third sensor comprises a sensor that monitors the electricity production rate or demand [Paragraph 38-39].

Claim 29: The system of the prior art is capable of producing a stream of 10% the average flow volume. The first air valve will get first take of the flow volume and therefore dictates how much is available for the remainder of the system. The system of the prior art is capable of operating in the same manner since the sensors give the specific amount of required fluid when it is demanded. The prior art inherently teaches

the specific claimed limitation since it is capable of resulting in claim manner when the system requires it.

Response to Arguments

"Time constant" is defined by the applicant in paragraph 16 to be the characteristic time for a response to be completed to a defined extent. It subsequent description teaches that the response time of the valves are varied. The applicant uses various delayed sensors whereas the prior art uses specific controllers to initiate operations. The prior art is capable of performing the same functionality as the instant application because the sensors are designed to activate to the specific demands of the region of the system.

The specific types of sensors being short and long bandwidth response times are not claimed. The current claim wording being through a controller operation leaves the interpretation of the claim open to a system that is capable of operating in the same manner. The recited paragraph on page 8 of the applicant's response does not teach away or teach a different invention than the current operation. The prior art teaches a pinging like controller that checks to see if alterations to the system are needed to the specific part; when a demand is changed the system will accommodate. The accommodation time frame will be different depending on the system requirements and therefore will operate in substantially the same manner. It is noted that instant application may operate in a different manner wherein a command can be initiated at

one time and using lagging signal valves may not need to ping as quickly, but that does not teach a patentably distinct structure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN YANCHUK whose telephone number is (571)270-7343. The examiner can normally be reached on Monday through Thursday 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/STEPHEN YANCHUK/
Examiner, Art Unit 1795

/Ula C Ruddock/
Supervisory Patent Examiner, Art Unit 1795